

HORIZON
2020

Understanding the fate of Arctic atmospheric mercury (Hg) deposition – A Hg stable isotope investigation of redox processes and Hg re-emissions

Fact Sheet

Project Information

MEROXRE

Grant agreement ID: 657195

[Project website](#)

DOI

[10.3030/657195](https://doi.org/10.3030/657195)

Project closed

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Start date

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31 March 2017

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EXCELLENT SCIENCE - Marie Skłodowska-Curie Actions

Total cost

€ 173 076,00

EU contribution

€ 173 076,00

Coordinated by

CENTRE NATIONAL DE LA
RECHERCHE SCIENTIFIQUE
CNRS

 France

Objective

Mercury (Hg) is a pollutant of global concern for human and ecosystem health. This is particularly true in the Arctic where indigenous populations are excessively exposed to dietary Hg from fish and marine mammal consumption. The deposition of Hg from the atmosphere to Earth surfaces and its re-emission via biogeochemical

reduction processes determine Hg concentrations in Earth surface reservoirs, such as soils, snow, and runoff into Arctic lakes and surface Ocean. In order to predict the impact of anthropogenic Hg emissions on net atmospheric Hg deposition and ultimately Hg concentrations in biota, it is important to understand these deposition and re-emission processes. The reduction of deposited Hg₂₊ to volatile gaseous Hg₀ and the oxidation of gaseous Hg₀ to reactive Hg₂₊, which is rapidly deposited from the atmosphere, control the global fate of Hg. Major knowledge gaps concerning the mechanisms of these redox processes exist.

Different photochemical and non-photochemical Hg₂₊ reduction mechanisms were found to fractionate Hg stable isotopes in distinct, identifiable ways. Also, different atmospheric Hg₀ and Hg₂₊ pools have been shown to have distinguishable Hg isotope signatures. Hg isotopes can thus provide new insights in the sources of Hg and redox transformation processes at the Earth-atmosphere interface, which are inaccessible by means of concentration and flux measurements alone. In the MEROXRE project proposed here we will combine the latest innovations in gaseous Hg measurements in porous media (soils, snow) with state-of-the-art Hg isotope techniques to investigate:

- (i) Hg isotope fractionation of Hg₂₊ reduction and gaseous Hg₀ oxidation in interstitial snow air and soil pores.
- (ii) Hg isotope fractionation factors associated with net gaseous Hg₀ re-emission fluxes from soil and snow
- (iii) the importance of gaseous Hg₀ oxidation and Hg₂₊ reduction and re-emission for the global Hg cycle by incorporating the results in a global Hg isotope model.

Fields of science (EuroSciVoc)

[natural sciences](#) > [chemical sciences](#) > [electrochemistry](#) > **[electrolysis](#)**

[natural sciences](#) > [chemical sciences](#) > [inorganic chemistry](#) > **[transition metals](#)**

[natural sciences](#) > [biological sciences](#) > [zoology](#) > [mammalogy](#) > **[cetology](#)**

[natural sciences](#) > [biological sciences](#) > [ecology](#) > **[ecosystems](#)**

[natural sciences](#) > [earth and related environmental sciences](#) > [atmospheric sciences](#) > [climatology](#) > **[climatic changes](#)**



Keywords

[mercury](#)

[stable isotopes](#)

[Arctic](#)

[deposition](#)

[emission](#)

Programme(s)

[H2020-EU.1.3. - EXCELLENT SCIENCE - Marie Skłodowska-Curie Actions](#)

MAIN PROGRAMME

[H2020-EU.1.3.2. - Nurturing excellence by means of cross-border and cross-sector mobility](#)

Topic(s)

[MSCA-IF-2014-EF - Marie Skłodowska-Curie Individual Fellowships \(IF-EF\)](#)

Call for proposal

[H2020-MSCA-IF-2014](#)

[See other projects for this call](#)

Funding Scheme

[MSCA-IF - Marie Skłodowska-Curie Individual Fellowships \(IF\)](#)

Coordinator



CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE CNRS

Net EU contribution

€ 173 076,00

Total cost

€ 173 076,00

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Region

Ile-de-France > Ile-de-France > Paris

Activity type

Research Organisations

Links

[Contact the organisation](#) 

[Website](#) 

[Participation in EU R&I programmes](#) 

[HORIZON collaboration network](#) 

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